

## **Improving Our Understanding of Susceptibility in the Aging Population to Environmental Exposures**

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A radical demographic shift is taking place in America, with aging adults being the fastest-growing segment of the population. Considerable research is underway on the biology of aging and on remedies for treating the diseases of aging. Remarkably little is known, however, about the risks to older adults arising from exposure to environmental pollutants. The aging population may be highly susceptible due to changes in activity patterns and decreases in metabolic, reserve, and repair capacities. Major uncertainties at this time, however, prevent firm conclusions regarding the types of pollutants, exposures, and physiological functions that may pose the greatest risk or mediate potential susceptibility. This dilemma is further compounded by enormous differences in the health status of individuals as they age.

As part of the US EPA's Aging Initiative, research in the National Health and Environmental Effects Research Laboratory (NHEERL) is focusing on the age-related vulnerability of the brain, heart, and liver to toxic substances. These organ systems are known to be compromised with age and also targets for environmental pollutants. The research involves a unique blend of basic laboratory studies and clinical investigations, using *in vivo* and *in vitro* methods, that will allow us to establish toxicity pathways from genes to behavior. Susceptibility is being assessed by comparing age-related changes in both the effects of chemical exposures and the time to recover following exposure. An important additional feature of this research involves documenting individual differences in both baseline function and exposure effects.

The results of NHEERL's studies will be used to refine existing physiological and pharmacokinetic models for quantitatively predicting the vulnerability of the aging population to environmental pollutants. These models will also be merged with ones being developed in the Office of Research and Development (ORD) for activity patterns and exposures in older adults. The integration of clinical and basic models and data will improve current risk assessment practices for dealing with this susceptible life stage.

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